

Louisville Metro Natural Hazards Mitigation Plan

Executive Summary

Louisville Metro Area Background: Louisville is located on the south bank of the Ohio River, 604 miles below Pittsburgh, Pennsylvania, and 377 miles above the mouth of the river at Cairo, Illinois. Louisville Metro is a 385 square mile river city located along the Ohio River adjacent to the McAlpine Locks and Dam at the Falls of the Ohio. Formed in 1780, Jefferson County is a well-known geographic area highlighted by rolling hillsides and meandering streams. Jefferson is the largest and the most densely populated county in the state and the 16th largest city in the United States. Population for Jefferson County is approximately 695,000 according to 2000 census data. UPS, Humana, Ford Motor Company, and GE are among the county's largest employers.

Natural Hazard Mitigation Planning: Disaster Mitigation Act of 2000: The Disaster Mitigation Act of 2000 (DMA 2000) is the latest regulation to improve the hazard mitigation planning process. According to DMA 2000, Louisville Metro, as a local community, is required to develop a comprehensive Natural Hazards Mitigation Plan.

President George Bush signed DMA 2000 on October 30, 2000. The new legislation reinforces the importance of mitigation planning in emphasizing planning for disasters *before* they occur. As such, DMA 2000 establishes a "pre-disaster hazard mitigation" program and new requirements for the post-disaster Hazard Mitigation Grant Program (HMGP).

Summary of the Benefits of Mitigation Planning

- X Leads to cost-effective selection of risk reduction actions
- X Builds Partnerships
- X Contributes to sustainable communities
- X Establishes funding profiles

DMA 2000 is intended to facilitate cooperation between state and local authorities as it encourages and rewards local, tribal, and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network better enables local and state governments to articulate their needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. As a result, communities must have an approved mitigation plan in place before receiving HMGP funds.

Plan Outline: Areas at-risk in Louisville Metro were identified, mapped, and assessed during an 18-month timeframe. Vulnerabilities were determined so that an appropriate mitigation strategy could be developed. The Plan contains the following five main sections or phases:

- 3.1 Prerequisites – Adoption of Governing Body
- 3.2 Description of the Planning Process

- 3.3 Risk Assessment
- 3.4 Mitigation Strategies
- 3.5 Plan Maintenance Procedures

Planning Partners: The Louisville Metro mitigation planning effort is a result of the partnership created by the Kentucky Division of Emergency Management (KyEM) and the Louisville/Jefferson County Metro Emergency Management Agency (EMA) through a Mitigation Planning Grant with the Federal Emergency Management Agency (FEMA).

Louisville/Jefferson County Metro EMA is primarily responsible for the coordination and development of the local natural hazard mitigation plan. Collaborating with EMA on the Plan are both the Louisville & Jefferson County Metropolitan Sewer District (MSD) and Louisville/Jefferson County Information Consortium (LOJIC). LOJIC's Graphical Information Systems (GIS) data and mapping capabilities provide Louisville Metro a perfect vehicle for designing a premier mitigation plan.

To ensure commitment and consensus, Louisville Metro's planning process relies on "stakeholder involvement and participation" as a main source of guidance for all phases of the plan. Additionally, stakeholder involvement ensures the plan is comprehensive and the mitigation strategy is implemented through local programs and regulations.

A local "Plan Development Team" designed and developed the Plan. The Plan Development Team is comprised of: Project Staff, LOJIC GIS staff, a Planning Team, and an Advisory Committee. The Planning Team (20 key agencies) is composed of local and state agency representatives, and local business leaders and educators. The Advisory Committee is composed of 35+- agencies, organizations, community representatives, and citizens.

HAZUS-MH: Louisville Metro is one of eight communities selected to participate in a FEMA-sponsored pilot project effort to use their new risk assessment software tool -- Hazards U.S. Multi-Hazard (HAZUS-MH). The FEMA pilot communities tested the software, which assisted communities in identifying, profiling, and assessing potential losses associated with earthquakes, floods, and other natural hazards.

Risk Assessment: The Plan's Risk Assessment is divided into five sections, as follows, so that a comprehensive analysis and review is completed for Louisville Metro's vulnerabilities.

- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends

Throughout the Risk Assessment, maps are used whenever possible to convey where the spatial data and at-risk areas are located. Maps also provide an invaluable GIS visual tool for analysis.

Identifying Hazards: Louisville Metro is prone to 12 Natural Hazards. Some natural hazards have little or no effect on the Louisville Metro area or in Kentucky and were not addressed in the Plan. The Plan includes identification of natural hazards where there is a historical record of damage caused to people and property or where the potential for such damage exists. The 12 hazards that are identified in the Louisville/Jefferson County Metro Emergency Operations Plan (EOP) are validated by historic impacts, past federal disaster declarations, probability rates, dollar losses to date, and discussions with key agencies.

Conditions, such as topography, soil characteristics, and meteorological conditions were reviewed. The Metro area is vulnerable to a wide array of natural hazards that threaten life and property due to Louisville's climate, geology, and geographical setting. Louisville's climate is described as "moist-continental." Winters are moderately cold with temperatures rarely below zero degrees Fahrenheit, with January being the coldest month. Average annual snowfall is about 17 inches. Spring and summer months are characterized by changeable, wet weather. Yearly precipitation is approximately 43 inches.

The table below lists the federally declared disasters affecting the Metro area from 1974 to 2003. The history of disasters in the Metro area shows the frequency of serious threat and emphasizes the importance of mitigation planning to prevent or at least minimize the effects of such disasters.

Louisville Metro Declared Disasters

DR #	DECLARATION DATE	DISASTER TYPE	# OF KY DECLARED COUNTIES
420	4/4/1974	Tornadoes	34
568	12/12/1978	Severe Storms, Flooding	37
821	2/24/1989	Severe Storms, Flooding	67
1089	1/13/1996	Blizzard	120
1163	3/4/1997	Flooding	101
1471	6/3/2003	Landslide, Severe Storm, Tornado, Flooding	44

Profiling Hazard Events: The hazard profiles in the Plan target the "at-risk" areas affected by each identified hazard. The purpose of the profiles is to determine the probability, magnitude, and the location and extent that each identified hazard may impact the Louisville Metro area. Included in the profile is information on past hazard events and their severity and resulting effects on transportation, safety, economics, etc.

Identifying Assets: The identification of assets provides sufficient information to enable the Planning Team and Advisory Committee to design a mitigation strategy and prioritize appropriate mitigation actions to reduce losses from identified hazards. Information used to identify the assets was gathered from resources such as local tax

and real estate records, local public works department infrastructure records, Census data, and GIS databases. Based on the analysis of this information, the Plan describes vulnerability to these hazards in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities.

Estimating Potential Losses: Loss estimations for each hazard include the vulnerable population, structures and facilities, economic activity, and environmental resources that are exposed. The facility and building total values for Louisville Metro are: facilities approximately \$4.7 billion and buildings approximately \$54 billion.

Louisville Metro's degree of vulnerability depends upon the risk of a particular natural hazard occurring (including such factors as scope, frequency, intensity, and destructive potential). Known High Hazard potential boundary areas can be mapped for Flood, Karst/Sinkhole, and Landslide. Existing buildings and facilities located in these hazard boundary areas are labeled "vulnerable" and noted that these structures have the potential to be substantially damaged. On the other hand, climate-related hazards cannot be mapped due to their random nature.

Analyzing Development Trends: The Plan provides a general description of land uses and development trends within the community so that mitigation options are considered in future land use decisions. All local land use & zoning plans, GIS data, ordinances, emergency operation procedures, and comprehensive plans (e.g. Cornerstone 2020) were reviewed for hazard data.

Ranking 12 Natural Hazards: The Hazard Risk Gauge and Risk Matrix provide a qualitative assessment of the 12 natural hazards that could occur in Louisville Metro.



Flooding consistently ranks as the number one natural hazard in the Metro area due to 11 major stream systems and approximately 790 stream miles. The elevation in Louisville Metro ranges from 383 to 902 feet above sea level and estimations show that 15% of the area is in the floodplain.

Risk Matrix

SEVERE RISK HAZARDS	Flooding Severe Thunderstorms
HIGH RISK HAZARDS	Hailstorm Tornado
MODERATE RISK HAZARDS	Earthquake Severe Winter Storms
LIMITED RISK HAZARDS	Dam Failure Extreme Heat Karst/Sinkhole Landslides Wildfire
LOW RISK HAZARDS	Drought

Mitigation Strategy: Louisville Metro's Plan includes a mitigation strategy that provides a blueprint for reducing the potential losses identified in the risk assessments. The Planning Team and Advisory Committee designed and developed the Mitigation Strategy during a tier of meetings and based their strategy on seven mitigation goals and objectives.

Five-Year Action Plan: The Mitigation Action Plan responds to the risk assessment with projects and activities to mitigate the 12 hazards. The action plan outlines projects that allow our community to make informed future land use and zoning decisions, design better infrastructure, and keep the public out of harm's way. Furthermore, the Action Plan projects address reducing the effects of hazards on new buildings and infrastructure as well as existing buildings and infrastructure.

The action plan recommends mitigation projects that can be integrated into job descriptions, comprehensive plans, capital improvement plans, zoning and building codes, permitting, and other planning tools. Included in the Action Plan are both an implementation timeline and the funding sources to implement each of the mitigation projects. For program funding, the mitigation measures in the Action Plan are cost effective, environmentally sound, and technically feasible. Every project or activity in the Action Plan lists a lead agency or personnel responsible for carrying out the actions, as well as potential partners. A Lead Implementer column lists a name of the contact person who will be able to report to the committee during the annual update and will be responsible for overseeing the project or activity.

The result of the Mitigation Action Plan is a proactive, community mitigation program to help local agencies, residents, and businesses to be better prepared to prevent and/or reduce losses from a hazard

Plan Maintenance Procedures: The Plan describes the method and schedule of monitoring, evaluating, and updating the Mitigation Plan within a five-year cycle. EMA, in partnership with MSD, LOJIC, and members of the Plan Development Team will monitor the status and progress of the plan elements on an annual basis. The plan will be reviewed, revised, and resubmitted to the State Hazard Mitigation Officer at KyEM and to FEMA Region IV when updated. As appropriate, the plan also will be evaluated after a disaster, or after unexpected changes in land use or demographics in or near hazard areas.

Adoption by Local Governing Body: In May 2005, the local government adopted the Louisville Metro Natural Hazards Plan by Resolution.